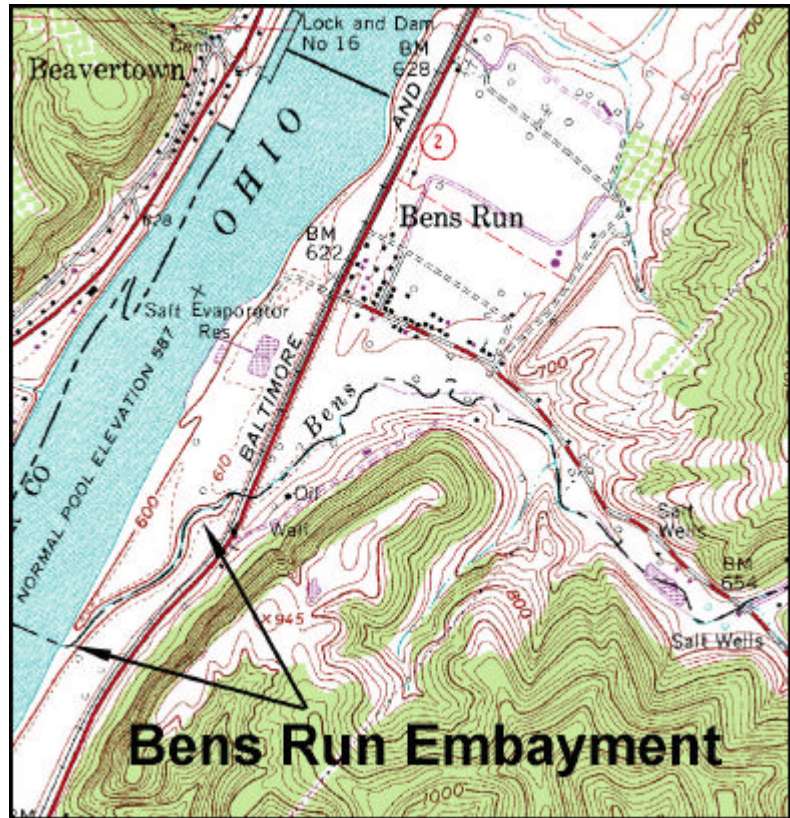


BENS RUN EMBAYMENT (WV-36 and 37)

1.0 Location

The proposed Bens Run Embayment project area is located in Tyler and Pleasant Counties, West Virginia approximately 2.4 miles northeast of Raven Rock, West Virginia and 1.1 miles south of Beavertown, Ohio. The project site is in the Ohio River Willow Island Pool, and the mouth of Bens Run is at Ohio River Mile (ORM) 147.8. The project site is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal

Bens Run Embayment, like all Ohio River embayments, was formed when the existing Locks & Dams were constructed and river (pool) elevations changed. Ohio River embayments have historically provided important and diverse off-channel habitat for many fish species. Over the years many of the embayments have silted in and no longer provide the quality or diversity of habitat previously provided.

The primary goals of the Bens Run Embayment project are to provide deepwater off-channel (slackwater) aquatic habitat that will provide over-wintering habitat for fishes in the Ohio River. Enhanced over-



wintering habitat along with increased habitat diversity would improve species diversity, facilitate a sustained fishery resource, and improve the recreational fishery in the area.

3.0 Project Description and Rationale

Deepwater habitat will be created by dredging an approximately 10-12 feet deep channel from the mouth of Bens Run at ORM 147.8 to the upstream portion of the embayment near the Baltimore and Ohio Railroad crossing just west of State Route 2 as shown on the project diagram. The area to be dredged will be a sinuous channel that restores deepwater connectivity through the embayment, and dredge spoil will be dewatered/placed in an agricultural field at a dredge disposal site south of the embayment.

4.0 Other Alternatives Considered

The Bens Run watershed is dominated by upland forest (>90 percent) with a minor amount of pasture and agricultural cropland. Historically, timber cutting activities, such as clear cutting, may have contributed to the Bens Run siltation problem. However, during the field investigation, it was concluded that headwater sedimentation did not currently contribute significantly to the sedimentation problem.

In order to minimize the rate of sedimentation in the Bens Run embayment, an upstream sediment retention basin was considered. However, since over 90 percent of the watershed is forested, it appeared that headwater sedimentation was not the primary factor contributing to the embayment sedimentation. Therefore, a sediment retention basin is not recommended at this time.

5.0 Existing Conditions

According to the U.S. Fish and Wildlife Service (USFWS), Bens Run embayment has been identified as a high quality habitat area by the Ohio River Islands National Wildlife Refuge (ORINWR). The area identified by ORINWR encompasses 130 acres, including 11 acres of palustrine emergent wetlands, 10.3 acres of riverine open water, and 12.5 acres of mature bottomland forested habitat. Sheltered shallow water habitat that supports submerged aquatic vegetation (SAV) is limited in the Ohio River. This habitat is particularly important to juvenile fishes, wading birds, migratory waterfowl, and a variety of game and non-game species.

Terrestrial/Riparian Habitat: The banks of Bens Run embayment are populated with a band of riparian and upland trees. The dominant riparian species present in the stand include box elder (*Acer negundo*), black willow (*Salix nigra*), and silver maple (*Acer saccharinum*) with a few black walnut (*Juglans nigra*) and black locust (*Robinia pseudoacacia*) present. Surrounding the embayment beyond the narrow riparian band of trees, the area is dominated by agriculture, primarily row crops such as corn and soybeans. In the upstream reaches of the embayment to the northeast of State Route 2, the terrestrial habitat in the Bens Run watershed is predominantly upland forest with some pasture.



Aquatic Habitats: The Bens Run embayment is a shallow embayment with depths that range from 1-3 feet. The average depth in the embayment is less than two feet. The banks are characterized by mud, and the bottom substrates are composed primarily of silt, mud, and organic matter. The embayment has become filled with silt primarily from the deposition associated with silt-laden Ohio River waters, especially from flood events. Sediments and debris from the Bens Run watershed may have also contributed to the siltation, however since over 90 percent of the watershed is forested, it is believed that the primary source of sedimentation is from silt-laden Ohio River waters.

Wetlands: The Bens Run embayment is very shallow due to siltation, and the extreme upstream (northeast) end of the embayment, especially northeast of State Route 2, is populated with a variety of wetland plants. The exposed portions of the site produce herbaceous emergent plants, such as grasses (*Echinochloa* spp.), smartweeds (*Polygonum* spp), rushes (*Juncus* spp.), sedges (*Carex* spp.), and flatsedges (*Cyperus* spp.), and woody shrubs such as buttonbush (*Cephalanthus occidentalis*), alder (*Alnus serrulata*), and black willow. The shallow littoral areas are also populated with a variety of emergent and submergent wetland plants. Jurisdictional wetlands would be restricted to the shallow water edges and bottomland hardwoods associated with the riparian zone adjacent to the Bens Run embayment.



Federally-Listed Threatened and Endangered Species: With the exception of the migratory bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), there are no federally-protected species known to occur within the project area according to the U.S. Fish and Wildlife Service (USFWS, 1999).

6.0 Project Diagram



7.0 Engineering Design and Requirements

7.1 Existing Ecological/Engineering Concern

The Bens Run embayment has filled with sediments due to several factors. These factors include: raised water levels from the impoundment of the Willow Island Pool; deposition of Ohio River silt-laden flood waters, especially during flood events; wave action from barge traffic; and headwater sediments from Bens Run.

7.2 Embayment Dredging

Maintenance dredging of the mouth of the embayment is required to provide deep water connectivity to the remainder of the embayment and to provide a suitable depth for boater access. An estimated 66,000 cubic yards of silty-clay material would be dredged to restore depths of 9-12 feet in the embayment mouth. A dredge disposal site is located to the south, adjacent to the embayment. A small geotube levee 1,400 feet in length would be constructed at the designated disposal site for dewatering.

Example of Geotube Levee



7.3 Planning/Engineering Assumptions

- ◆ A small auger head dredge would be used, and the material would be pumped directly to the disposal site.
- ◆ Bottom side slopes will be reshaped to a 3:1.

8.0 Cost Estimate (Construction)

Bens Run Dredging - Engineering costs for the proposed project are contained on Table 1. A detailed MCACES cost estimate for the proposed project is included in Appendix D.

Table 1. Engineering Costs.	
Item	Cost
Dredging	\$124,200
Geotube Levee	\$21,300
Mobilization & Contingencies @ 20%	\$29,100
TOTAL	\$174,600

9.0 Schedule

Bens Run Embayment: The estimated construction time for this project is shown on Table 2.

Table 2. Construction Schedule.	
Item	Time
Dredging	138 Days
Mobilization	6 Days
TOTAL	144 Days

10.0 Expected Ecological Benefits

Terrestrial/Riparian Habitat: Since most of the impacts associated with the Bens Run Embayment project would be in-stream, there would be no reasonably foreseeable beneficial impacts to terrestrial/riparian resources.

Aquatic Habitats: Long-term beneficial impacts to aquatic resources would be anticipated as a result of implementing the proposed project. Dredging of the mouth of Bens Run would result in long-term beneficial impacts to fishes due to the improved/deepened access to the Bens Run embayment. Fishes would be allowed free access to the embayment, especially during low flow periods. Habitat requirements for fishes change seasonally and improved access to the embayment would be considered beneficial. Restoring/increasing the depths of the embayment would provide over-wintering habitat for fishes, especially sport fish such as black basses (Sheaffer, 1986).

Wetlands: There would be no reasonably foreseeable beneficial impacts to jurisdictional wetlands as a result of dredging/constructing the Bens Run Embayment.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable beneficial impacts to federally listed threatened and endangered species as a result of implementing the Bens Run Embayment project.

Socioeconomic Resources: There would be short-term and long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. The short-term beneficial impacts would be related to costs and local expenditures associated with the dredging of Bens Run. Long-term socioeconomic benefits would be realized through improved recreational fishing opportunities. Long-term indirect beneficial impacts will be realized through local expenditures for fishing tackle, hunting and fishing gear, bait, food, gas, and other associated products.

11.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitat: There would be short-term adverse impacts to terrestrial/riparian resources as a result of implementing the proposed project. There would be short-term adverse impacts to terrestrial species from construction-related noise and disturbance. Considering the existing high volume of disturbance from barge traffic along the Ohio River and recreational boat usage in the area, it is likely that the increased noise/disturbance impacts would be very minor.

There would be short-term adverse impacts to the agricultural community that lies to the north of the embayment. This area, which is privately owned and currently farmed, would serve as the dredge disposal site. Adverse impacts to this area would be considered short term, because it is assumed that the site can be farmed following the dewatering and grading of the spoil material. The agricultural field provides little habitat for terrestrial wildlife, and adverse impacts to terrestrial wildlife would be minimal and short term.

Aquatic Habitats: There would be a potential for adverse affects to aquatic species, especially immobile benthic invertebrates and young-of-the-year fishes during the dredging of the Bens Run embayment. Localized populations of benthic invertebrates could be directly disturbed during the construction operation. In addition, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced sediments, however these adverse impacts to aquatic species would be short term.

The shallow water and vegetated habitats in the Bens Run embayment provide cover, spawning habitat, and nursery habitat for fishes. The structure associated with emergent and submersed vegetation provides habitat for aquatic invertebrates and cover for fishes, especially young-of-the-year (Wege, 1979; Killgore, 1989; and Eggering, 1991). The loss of littoral and submersed aquatic vegetative habitats would be considered adverse for invertebrates and some fishes, especially young-of-the-year, however these adverse impacts would not be severe. As currently envisioned, the Bens Run dredging will not affect the shoreline or littoral zone. The adverse impacts to aquatic species would be short term, and the overall beneficial impacts of the restoration project would outweigh the adverse impacts.

Wetlands: As currently designed, the shoreline and littoral zone will not be impacted by the dredging operation. Therefore, there would be no adverse affects to jurisdictional wetlands as a result of implementing the Bens Run Embayment project.

Federally-Listed Threatened and Endangered Species: There would be no adverse affects to federally-listed threatened and endangered species as a result of implementing the Bens Run Embayment project.

Socioeconomic Resources: There would be short-term adverse impacts to socioeconomic resources as a result of implementing the Bens Run Embayment project. There would be short-term adverse impacts associated with the temporary loss of farming at the dredge disposal site. The socioeconomic impacts would be short term because it is assumed that the disposal area can be farmed following the completion of the spoil dewatering.

12.0 Mitigation

No significant adverse impacts are expected. Minor impacts associated with site dredging and spoil placement may occur during the construction of this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts.

Following the completion of the dredging and spoil dewatering operation, the dredge disposal site will be graded and restored for agricultural purposes. This will allow the effected landowners to resume farming.

The locations of jurisdictional wetlands and submersed aquatic vegetation (SAV) should be mapped prior to final project design and dredging in those areas should be avoided.

To reduce adverse impacts to larval and juvenile fishes dredging should not be conducted during the spring and/or early summer when these fishes are most susceptible.

13.0 Preliminary Operation and Maintenance Costs:

Bens Run Embayment Operation and Maintenance costs are summarized on Table 3.

Table 3. Operation and Maintenance Costs (50 Year Life)		
Maintenance	Frequency	Costs
Maintenance Dredging for Bens Run	5 years	\$436,632

14.0 Potential Cost Share Sponsor(s)

- ◆ State of West Virginia
- ◆ barge/towing industry

15.0 Expected Life of the Project

It is anticipated that the dredging operation would provide meaningful depths for fishes for approximately 5 years before additional dredging would be necessary. All maintenance costs are based on a 50 year project life.

16.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit and further assessed via a database search of HTRW records in the site area.

Site Inspection Findings. The Ohio River flows from northeast to southwest past the project site located on the southeast side of the river in West Virginia. The project area includes the mouth of the Bens Run embayment and about a 0.5 mile distance upstream from the mouth. The town of Bens Run, West Virginia is located on the north fringe of the study area. State Route 2 and the Baltimore and Ohio Railroad cross Bens Run approximately 0.5 miles upstream from the embayment mouth. North of the project area, corn fields are found downstream from the railroad (RR) crossing and pasture is found upstream of the crossing. There are wooded bluffs to the south and southeast. Pasture is to the east and the Ohio River is to the west. The entire project area is privately owned.

The following environmental conditions were considered when conducting the June 15, 1999 project area inspection:

- | | |
|--------------------------------------|-----------------------------|
| ◆ Suspicious/Unusual Odors; | ◆ Impoundments/Lagoons; |
| ◆ Discolored Soil; | ◆ Drum/Container Storage; |
| ◆ Distressed Vegetation; | ◆ Electrical Transformers; |
| ◆ Dirt/Debris Mounds; | ◆ Standpipes/Vent pipes; |
| ◆ Ground Depressions; | ◆ Surface Water Discharges; |
| ◆ Oil Staining; | ◆ Power or Pipelines; |
| ◆ Above Ground Storage Tanks (ASTs); | ◆ Mining/Logging; and |
| ◆ Underground Storage Tanks (USTs); | ◆ Other |
| ◆ Landfills/Wastepiles; | |

None of the environmental conditions listed above were observed in the project area.

Risk Management Data Search. A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The search complied with ASTM Standard Practice for Environmental Site Assessments, E 1527-97. The search report with maps showing the search area around the project site is presented in Appendix B. The search distance was configured to include the area of the project and a one mile buffer zone beyond the center-point of the project area. It was conservatively assumed that any environmental conditions beyond the project area buffer zone would not impact the project. Databases searched and the distance searched from the project site for each environmental item (e.g., USTs, NPL sites, etc.) are as follows:

Databases	Search Radius (Miles)
NPL: National Priority List	1.00
Delisted NPL: Contaminated sites removed from the NPL.	1.00
RCRIS-TSD: Resource Conservation and Recovery Information System	1.00
SHWS: State Hazardous Waste Sites	1.00
CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System	1.00
CERC-NFRAP: Comprehensive Environmental Response, Compensation, and Liability Information System	1.00
CORRACTS: Corrective Action Report	1.00
SWF/LF: Available Disposal for Solid Waste in Illinois- Solid Waste Landfills Subject to State Surcharge	1.00
LUST: Leaking Underground Storage Tank	1.00
UST: Underground Storage Tank	1.00
RAATS: RCRA Administrative Tracking System	1.00
RCRIS-SQG: Resource Conservation and Recovery Information System for Small Quantity Generators	1.00
RCRIS-LQG: Resource Conservation and Recovery Information System for Large Quantity Generators	1.00
HMIRS: Hazardous Materials Reporting System	1.00
PADS: PCB Activity Database System	1.00
ERNS: Emergency Response Notification System	1.00
FINDS: Facility Index System/Facility Identification Initiative program Summary Report	1.00
TRIS: Toxic Chemical Release Inventory System	1.00
NPL Lien: NPL Liens	1.00
TSCA: Toxic Substances Control Act	1.00
MLTS: Material Licensing Tracking System	1.00
ROD: Record of Decision	1.00
CONSENT: Superfund (CERCLA) Consent Decrees	1.00
Coal Gas: Former Manufactured gas (Coal Gas) Sites	1.00
MINES: Mines Master Index File	1.00

HTRW Findings and Conclusions An inspection of the project site and a search of environmental records relevant to the project site, and extended areas beyond, have revealed no evidence of recognized environmental conditions in connection with this project site.

17.0 References

References:	
Eggering, 1991	Eggering, L. F. 1991. Thesis: The affect of aquatic macrophytes on the available prey/predator ratio of fishes in the littoral area of Kentucky Reservoir. Murray State University, Murray, Kentucky.
Killgore, 1989	Killgore, K. J., R. P. Morgan II, and N. B. Rybicki. 1989. Distribution and abundance of fishes associated with submersed aquatic plants in the Potomac River. North American Journal of Fisheries Management.
Sheaffer, 1986	Sheaffer, W.A. and J.G. Nickum. 1986. Backwater areas as nursery habitats for fishes in Pool 13 of the Upper Mississippi River. Hydrobiology No. 136 pp. 131-140.
USFWS, 1999	U.S. Fish and Wildlife Service, July 6, 1999. Federally Listed Endangered and Threatened Species in West Virginia.
Wege, 1979	Wege, G. J. and R. O. Anderson. 1979. Influence of artificial structures on largemouth bass and bluegills in small ponds. North Central Division American Fisheries Society Special Publication 6.

APPENDIX A Threatened & Endangered Species

APPENDIX B Hazardous Toxic and Radiological Wastes

APPENDIX C Plan Formulation and Incremental Analysis**Project Site Location:** (Include enough description or landmarks to find).

The proposed Bens Run Embayment project area is located in Tyler and Pleasant Counties, West Virginia approximately 2.4 miles northeast of Raven Rock, West Virginia and 1.1 miles south of Beavertown, Ohio. The project site is in the Ohio River Willow Island Pool, and the mouth of Bens Run is at Ohio River Mile (ORM) 147.8. The project site is within the jurisdiction of the Huntington District, U.S. Army Corps of Engineers (USACE).

Description of Plan selected:

Deepwater habitat will be created by dredging an approximately 10-12 feet deep channel from the mouth of Bens Run at ORM 147.8 to the upstream portion of the embayment near the Baltimore and Ohio Railroad crossing just west of State Route 2 as shown on the project diagram. The area to be dredged will be a sinuous channel that restores deepwater connectivity through the embayment, and dredge spoil will be dewatered/placed in an agricultural field at a dredge disposal site south of the embayment.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? Yes and description

Reduce the amount of dredging.

Larger Size Plan Possible? Yes and description

Increase the amount of dredging and/or construct a headwater sediment retention basin.

Other alternatives? No

Restore/Enhance/Protect Terrestrial Habitats? Objective numbers met Restore, Enhance, & Protect Wetlands? Objective numbers met Restore/Enhance/Protect Aquatic Habitats? Yes Objective numbers met A1, A5, A7

Type species benefited: Fishes and invertebrates.

Endangered species benefited: none

Can estimated amount of habitat units be determined:

Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources? Yes – West Virginia DNR

Plan considered complete? Connected to other plans for restoration?

Real Estate owned by State Agency? Federal Agency?

Real Estate privately owned? Yes, in dredge disposal area.

If privately owned, what is status of future acquisition?

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Provide habitat diversity and winter velocity shelters for fishes.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?

Yes / No

Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity: _____

Non-government Entity _____

Corps Contractor _____ Date _____

U.S. Fish & Wildlife Representative _____ Date _____

State Agency Representative _____ Date _____

U.S. Army Corps of Engineers Representative _____ Date _____

Terrestrial Habitat Objectives

- T1 Riparian Corridors
- T2 Islands
- T3 Floodplains
- T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

- W1 Forested Wetlands: Bottomland Hardwoods
- W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands
- W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

- A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)
- A2 Riverine submerged and aquatic vegetation
- A3 Sand and gravel bars
- A4 Riffles/Runs (tailwater)
- A5 Pools (deep water, slow velocity, soft substrate)
- A6 Side Channel/Back Channel Habitat
- A7 Fish Passage
- A8 Riparian Enhancement/Protection

APPENDIX D Micro Computer-Aided Cost Engineering System (MCACES)